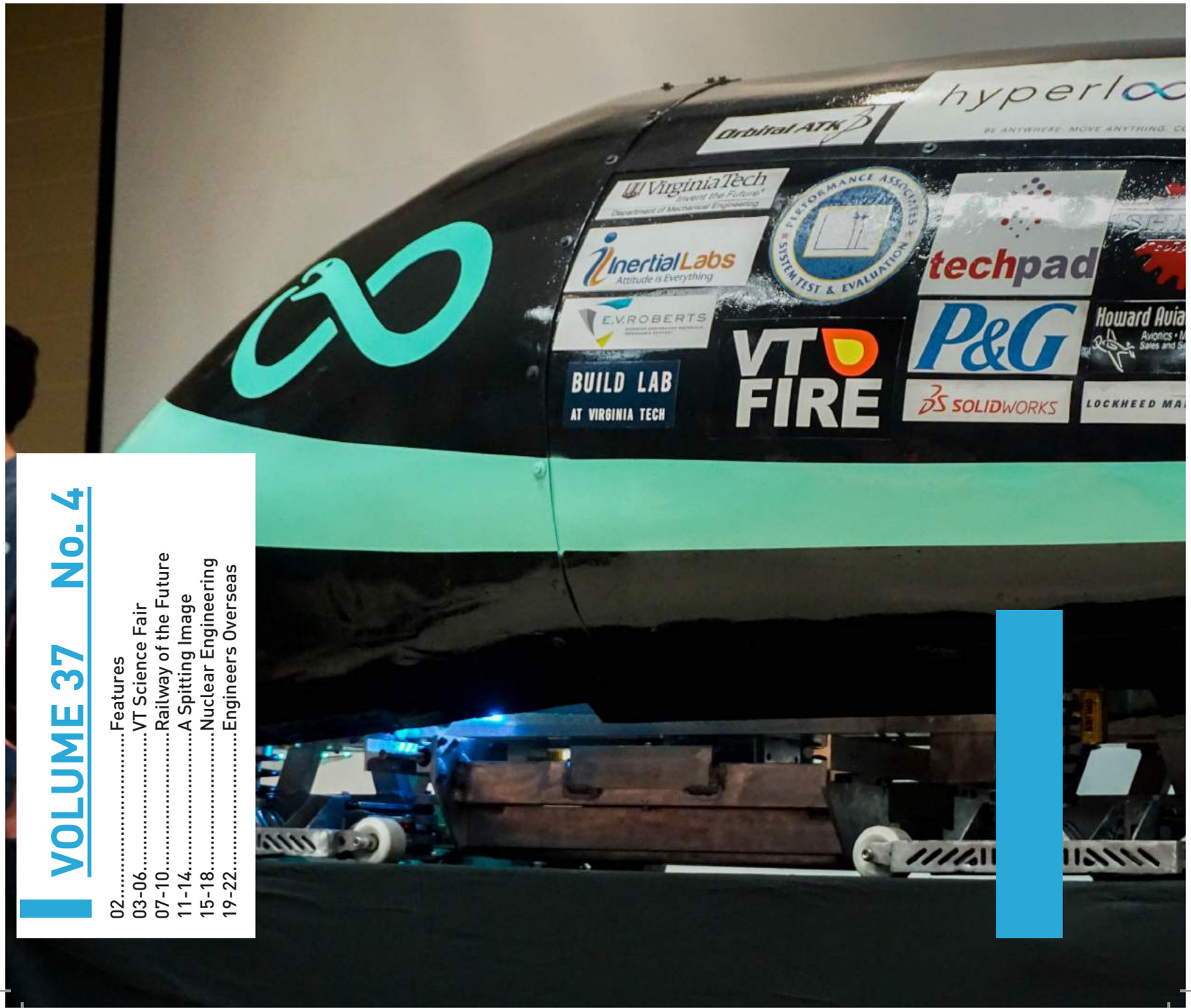
ENGINEERS' FORUM

VIRGINIA TECH'S PREMIER STUDENT-RUN SCIENCE & ENGINEERING MAGAZINE



VOLUME 37 No. 4

ENGINEERS' FORUM

Letter From the Editor

Welcome, readers! The staff at Engineers' Forum magazine is excited to fill you in on the latest, most exciting engineering stories going on in our community. Our writers and photographers have delivered top quality work for you this time around and seek to continue doing so throughout their time at Engineers' Forum.

As usual, the Virginia Tech community is deeply involved in several important areas of engineering work. The five stories in this issue of our magazine highlight some of the groundbreaking work underway in our community. Our first article, written by Biochemist Soshiant Raeesian, is a community-oriented analysis of the recent VT Science Festival and the importance of Virginia Tech's influence on the youth in the locality. Next, one of our newest writers, Brook Misailidis, delivers a detailed update on the progress of the Vhyper team, as they are currently testing a pod for the Hyperloop. Arianna Krinos, one of our more experienced writers, attended a unique lecture on genetic engineering and has written an interesting highlight piece on the revolutionary work of Sir Ian Wilmut from the University of Edinburgh. We have also covered the emergence of an upcoming new Nuclear Engineering minor on campus, which was reviewed by Alex John. Finally, Abby Slater reports on Engineers Without Borders at VT, an organization which has provided solar cells and other important supplies and technologies to impoverished communities in Uganda, Guatemala, and the Dominican Republic.

Our magazine can only succeed with the continued support of our student body, so we thank you for taking the time to appreciate our work! Look out for our next issue in February, 2017. Our team is excited to produce another issue full of exemplary work.

Editor-in-Chief,

Zeyad Zeitoun

Zeyad Zeitoun

www.ef.org.vt.edu

Virginia Tech-Engineers' Forum

On The Cover

Photo: Leoul Yiheyis

An outside view of the Vhyper pod displaying its aerodynamic design. Sponsors that contributed to the team were listed on the side. Read more on page 7.

VOLUME 37 No. 4

Features

VIRGINIA TECH SCIENCE FESTIVAL: BIGGER THAN YOU MAY THINK

Written by Soshiant Raeesian
Junior Biochemistry

Photos by Lucas Rose

It's gratifying to witness the positive impact our prestigious research institution has on the local community. Children growing up in the New River Valley recognize Virginia Tech as the powerhouse for educational achievement and innovation. Faculty and students of Virginia Tech serve as inspirational figures for the rising youth throughout Blacksburg and the surrounding areas. Our presence enables young minds to aspire to higher levels of learning outside of their classrooms. Gina Schnur, who hosted the Krinkle Cube exhibit at the Virginia Tech Science Festival, stated, "We want to get kids excited about science. We want to show them the multitude of opportunities available around them outside of what they're learning in their classrooms." Virginia Tech's Science Festival, which took place at the Moss Arts Center on October 8th, enables young minds to find inspiration in the numerous fields that make up the world of science.

Formerly known as the "Virginia Science Festival," this event has brought together local students in Virginia since October 2014. The recent name change stirred up some controversy. Phyllis Newbill, the festival's organizer, stated that, "The change in title reflects their change in focus towards organizing strong local collaborations rather than trying to organize a statewide event." She believes it emphasizes the importance of fortifying a strong relationship with the local community. Dr. Newbill commented on the importance of educating youth, saying "Seeds are planted and sparks are ignited to help the flame of love for science for a lifetime … even the exhibitor walks away from the experience with a new appreciation for everything they do."

Children and their families traveled from places all over the state of Virginia to attend this explorative spectacle. Brian Hairston is an agent for the 4-H Foundation from Henry County, a program that focuses on introducing young children to interdisciplinary STEM projects. The 4-H Foundation supplied two transport buses to the Virginia Tech Science Festival. Mr. Hairston said, "This morning we got 103 of us ready to hit the road for our 2 hour trip to Blacksburg from Henry County." Virginia Tech and Virginia State University support the 4-H Program as a cooperative extension from the land grant universities. The university's innovative reputation draws an audience from all around the state to experience a variety of science-related demonstrations and exhibits. All

Below: Young children are pictured here engulfed in the virtual world of Krinkle Cube. The headset features a virtual reality game provided by the Center for Human Computer Interaction and 3D User Interfaces group (CHCI 3DUI Group).

Below: Children had the chance to experiment with the Cartesian Diver mechanism in multi-colored bottles. This exhibit and others were presented by the Craig and Giles County 4-H Program to demonstrate basic science principles in fun and engaging ways.

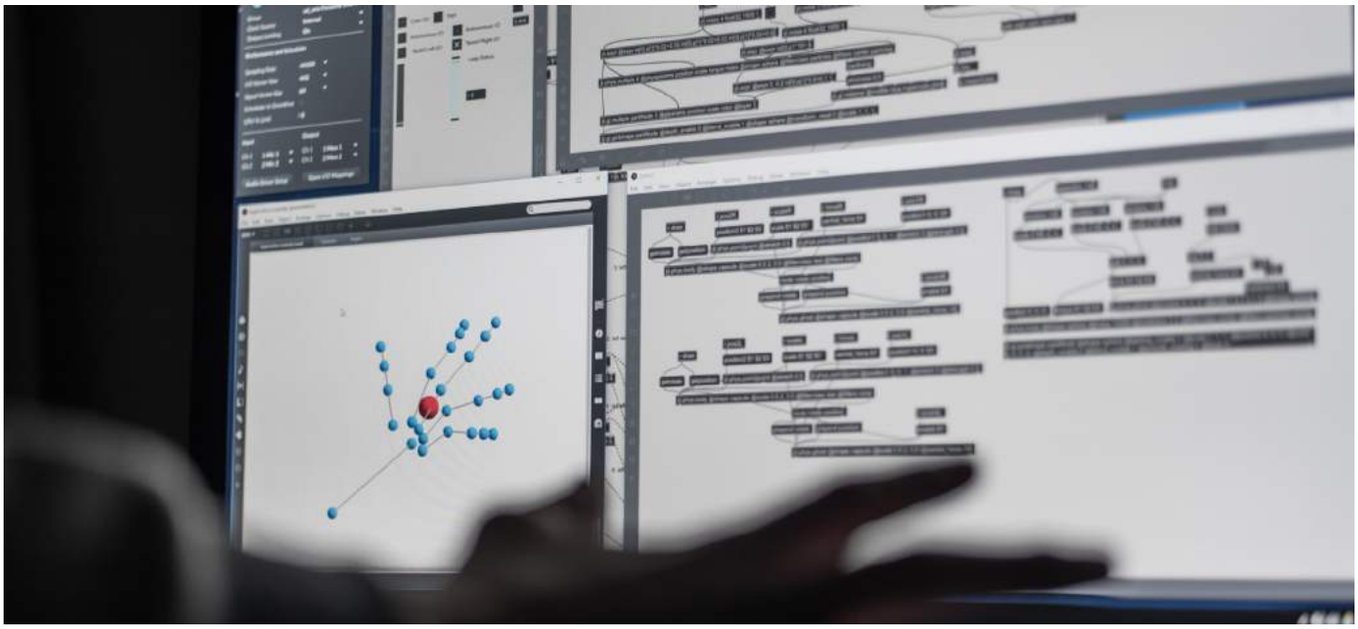
throughout the Moss Arts Center people of all ages wandered around illuminating exhibits, each inspiring an air of curiosity. Booths all around the main floor exhibited various projects ranging from traditional science projects, such as the Cartesian diver, to contemporary innovations, such as Musical Robots.

The Cartesian Diver, named after René Descartes, is a classic science experiment. It demonstrates the effects of buoyancy with an air-filled float suspended almost magically in the middle of a water bottle. Sarah Pratt helped children understand the concept of the Cartesian Diver; when asked about the importance of the event she said, “This is an important way to show kids that there are so many different fields outside of what they’re learning in the classroom.” A lot of children constantly feel a need for exploration, so is it valuable to lead them to ask important questions, like why certain things are the way they are and how they got be that way. Instilling this mentality can be achieved by showing children something like the Cartesian Diver that defies common sense.

The Digital Interactive Sound & Intermedia Studio (DISIS), founded by Dr. Ivica Ico Bukvic, demonstrates a unique coalition of interdisciplinary fields that many can relate to. Children are typically familiarized with music from an early age, thus connecting the performing arts to science with technology is a great way to enrich K-12 education via familiarity. Kyriakos Tsoukalas hosted the Musical Robots exhibit as a member of the DISIS team. He said, “Music is something we’re familiar with so it can easily be used as a vessel to facilitate our understanding of programming.” These unique exhibits encourage students to look deeper into music and see the inner workings of a system that they may be familiar with.

Constant advancements in technology broaden the range of working systems under their influence. All the exhibits and demonstrations displayed at the Virginia Tech Science Festival were designed to spark a desire to learn about “how” and “why” things work the way they do. Whether it is a traditional experiment such as the Cartesian Diver or a contemporary innovation such as Virtual Reality technology, these demonstrations hope to instill a desire to learn in the community’s youth so they can better build a better future for themselves and the generations to come.

Below: Plasma is a hand tracking and projection mapping system funded by the Institute for Creativity, Arts, and Technology. It displays an array of particles programmed using particle physics that participants can control and manipulate through the use of a LEAP Motion digital tracking camera.



Right: An angled view from the bottom of the pod reveals the pod's braking mechanism and suspension. The wheels are only used during the launch and braking phases of transportation, as well as in emergency situations.

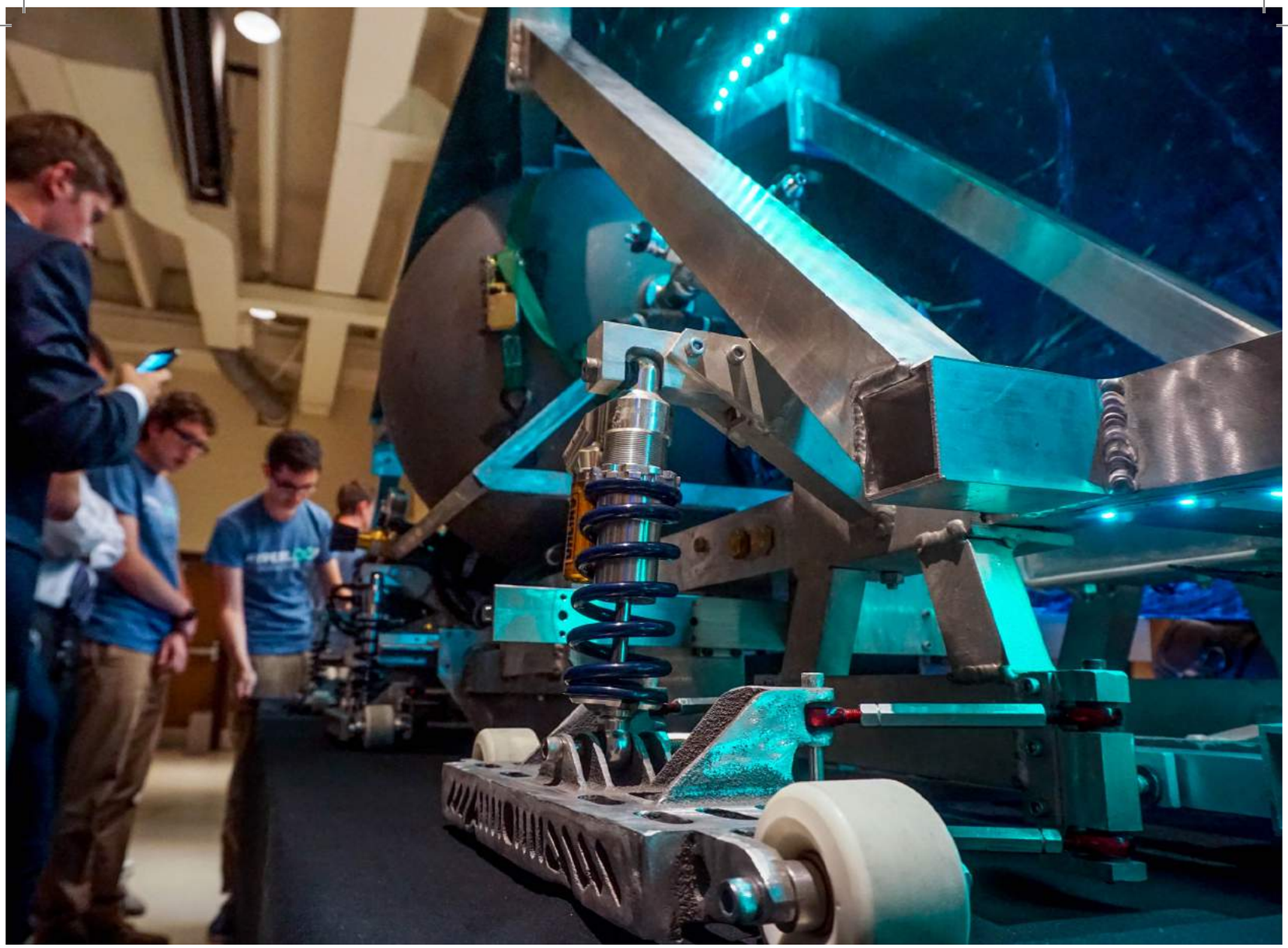
UNVEILING THE VHYPER: RAILWAY OF THE FUTURE

Written by Brook Misailidis
Sophomore Biochemistry

Photos by Leoul Yiheyis

The February issue of this year's Engineers' Forum featured a story on Hyperloop, an idea for a futuristic form of transportation proposed by entrepreneur and visionary Elon Musk. Space X's development team outsourced the incubation of this idea by tasking universities around the world with the challenge of developing a prototype pod. This allowed for an active development of ideas for the Hyperloop through existing institutions completely separate from SpaceX. Soon enough our students gained interest and Virginia Tech answered the call in August 2015 with our own team—Vhyper. Dr. H. Pat Artis from the advisory board of Aerospace department and Mr. Dewey Spangler, manager of the Ware Lab, have assisted the group of students as the team's faculty advisors.
The concept for Hyperloop consists of a pod travelling within an enclosed, vacuum-sealed track. The design is intended to eliminate air resistance that would otherwise act against the pod's acceleration. The pod's potential maximum speed of 760 mph is just below the speed of sound (767 mph). Hyperloop would serve in much of the same capacity as current rail transportation, but at a far superior rate. The usual six-hour car ride from Los Angeles to San Francisco is drastically reduced to a convenient 30-minute ride on Hyperloop. The current goal of the design teams working on the project is to achieve the fastest speed along a 1.5-kilometer test track located at SpaceX's headquarters in Hawthorne, CA.

Virginia Tech's team debuted their design this past January at Texas A&M alongside 120 other teams during the first phase of the competition; Vhyper ranked in the top 5 for overall design. Initially 1200 teams entered the competition after SpaceX announced it in June 2015, which illustrates just how intensely competitive the entire selection process was. SpaceX



later invited Vhyper to Hawthorne to attend the reveal of the 1.5-kilometer test track constructed to test their prototype pods.

On September 12th of this year, Vhyper unveiled their fully functional pod after 55 weeks of collaborative effort. The team will return to SpaceX with their pod for the upcoming stage of the competition in January. This team has grown from just 20 members at the start to 32 undergraduate members with six graduate advisors.

Faculty Advisor Dr. H. Pat Artis shared remarks on how daunting the task seemed at first and credited the students' commitment and drive towards this impressive outcome: "To be perfectly honest … I didn't think we would go far. [The project] would require multiple skills. They manage to recruit a tremendous quantity of highly qualified students. They have never stopped working; nights, weekends, summer … at the design weekend at Texas A&M I had this pleasant experience of dozens of different faculty members from other universities coming up and saying how wonderful the team was, how good the design was … their work made it all worthwhile."

The greater Vhyper team is composed of four smaller teams lead by different team leaders: Shayan Malik (Project Manager), Emir Shmanovic (Lead Mechanical Engineer), Keith Bahm (Lead Propulsion Engineer), Brian Elliott (Lead Software/ Electrical Engineer), and Laura Wolinsky (Financial Controller).

The largest team, mechanical, focuses on the brakes and suspension; Hyperloop utilizes the same technology as high speed bullet trains—magnetic levitation (Maglev). The pod runs on an eddy-current produced by a magnetic field from magnets oriented to generate either lift or drag. Wheels are used both to initiate motion and serve as an emergency brake. A pneumatic system is needed for braking at high speeds to provide a force proportional to the speed for smooth deceleration.

The aerospace team worked on propulsion along the track and constructing an aerodynamic body. Four layers of carbon fiber, created by the students themselves, compose the lightweight outer layer. Multiple panels form the skin and allow for convenient manufacturing and maintanence. The pod produces 3,000N of thrust using a nitrogen propellant and spherical pressure system. The software/electrical team was designated responsibility of the power and control systems of the pod. Once the pod is enclosed inside the track it is no longer accessible and could only be monitored from the outside; the magnetic sensors and other devices need to designed such that the pod can be controlled remotely at all times. The stability system monitors the pod precisely to determine the pod's position in the track and can enact a complete stop to prevent any damage.

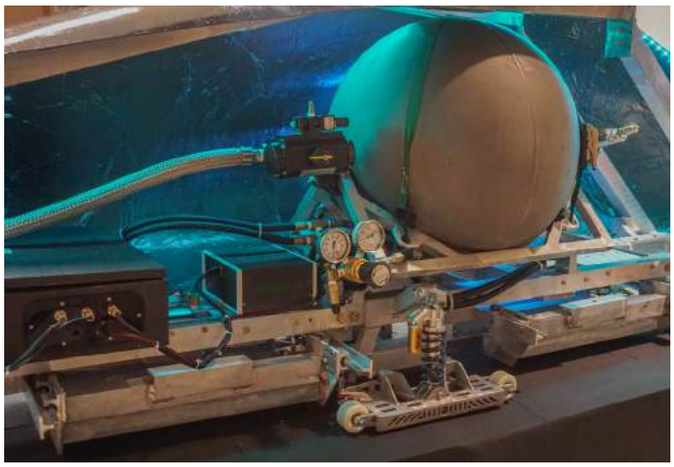
The finance team is the smallest group; however, they had a growing, integral role in the acquisition of this support. At the

Below: The Vhyper team posing in front of their newly unveiled prototype pod. They are joined by their advisor Dr. H. Pat Artis and President Sands.

team's inception, their only sponsor was Proctor & Gamble. Now, a year later, 24 companies stand behind our team. Dr. Artis expressed his gratitude to all collaborators saying, "The support … from individual departments like Aerospace, BEAM (biomedical engineering and mechanics), and Mechanical and from the sponsors has just been gratifying. We're looking forward to going to Hawthorne to test in January [2017] and I'm confident that we're going to place."

Virginia Tech has recently funded $225,000 towards building a local Hyperloop test track as part of the greater Intelligence Infrastructure Initiative at the Plantation Road research facility. The Provost, College of Engineering, and Institute for Critical Technology and Applied Science (ICTAS) each provided $75,000 to make up this fund. Dr. Stefan Duma, director of ICTAS, elaborated on this endeavor, "It's going to be custom, one-of-a-kind, the only one on the east coast where the students will actually put their prototype Vhyper device on and test it. This is going to be part of our Autonomous Village and Autonomous Systems work [through ICTAS] which is part of the Intelligent Infrastructure Initiative … the new test track will be built in the same general vicinity as the Autonomous Village and Smart Road."

President Sands also attended and shared some remarks on the team: "Well, I'm just incredibly impressed with the teamwork that has been demonstrated in getting to this point and obviously they're over the hump in a lot of regards but there's a lot of work left to do; but just watching the teams and their different areas of expertise, everything from business to electrical engineering, aerodynamics, mechanical systems have all clearly worked together to get to this point. I'm excited to see them get out there and beat MIT."



Above: This exposed prototype shows the propulsion apparatus and control system of the Vhyper pod. The spherical container and connected tube compose the specially-designed nitrogen propulsion mechanism.

Right: Professor Wilmut poses next to his marvelous achievement, the clone Dolly, circa mid-1990s.

Credit: The Roslin Institute

THE DOLLY EXPERIMENT: A MARVEL OF GENETIC ENGINEERING

Article by Arianna Krinos
Junior Computer Science & Biological studies

Photos by Kirby Koch

The Lyric Theatre in Downtown Blacksburg was packed on Thursday, October 6. Crowds of people ranging from veterinary school personnel to undergraduate students from various colleges—Engineering, Science, and Business among them—flooded into the makeshift lecture hall. The guest was a particularly high-profile one; coming all the way from Edinburgh, Scotland, Sir Ian Wilmut resides as the current chair of the University of Edinburgh's Scottish Centre for Regenerative Medicine. What rocketed the professor to international fame, however, was a particular research project. Sir Wilmut led the team of scientists that cloned Dolly the sheep in 1996.

Sir Wilmut's presentation was Virginia Tech's first distinguished lecture on regenerative medicine. Sponsored primarily by the College of Agriculture and Life Sciences and the College of Veterinary Medicine, the visit was orchestrated in light of the increasing importance of the university's Interdisciplinary Graduate Education Program (IGEP) in Regenerative Medicine. The program intends to bring together the skills of diverse areas of academic focus—including Engineering, Biomedical and Veterinary Sciences, and Business—in order to solve problems related to longevity and medical treatment and care in light of advances in regenerative biotechnology. The program holds that ethical and societal impacts are just as important as scientific progress when it comes to the treatment of disease and consideration of potential genetic manipulation. The content of the lecture was also important in the wake of Virginia Tech's ongoing development of undergraduate infrastructure in biomedical engineering, particularly through the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences and the offered minor in Biomedical Engineering. The growth of Virginia Tech's Carilion School of Medicine and Research Institute and the Virginia-Maryland Regional College of Veterinary Medicine also contribute to the demand for such an accomplished lecturer.

The discussion began by recounting his involvement in animal science research from early in his career. He talked about how some of the studies completed by others in the mid-1970s (such as the successful freezing, thawing, and use of bovine embryos) revolutionized both agriculture and his own direction of inquiry. In addition, he mentioned his recollection

of the first time a human protein was expressed in sheep's milk, a landmark accomplishment for the use of animals for human medicine and organ transplants. When Sir Wilmut was asked why his team chose to clone a sheep rather than another laboratory animal, he remarked that a cow, around which fewer regulations are established than some unfarmed animals, would have been objectively preferable due to their increased milk output. He joked that when they encountered sheep, they saw them as, "small, cheap cows." Wilmut's method for cloning Dolly, which involved merging a mammary cell from an existing adult with a fertilized embryo, has become a part of the foundation of the genetic studies which have characterized much of molecular biology in the past twenty years. He conjectured that one of the most significant impacts of the project was that "biologists were made to think differently." There was a fundamental paradigm shift: genetic information can be taken "all the way back to development" in that a new individual can be created from an entirely differentiated adult cell, effectively signifying that any regulatory changes that occur when different cell types arise can be completely reversed.

Many applications of Sir Wilmut's research have been direct, including the cloning of pigs by PPL Therapeutics at the Virginia Tech Corporate Research Center in the early 2000s. However, most of the Dolly experiment's impact lies in the secondary impacts of the research and the alteration in

"It is only by studying the disease that you can understand it... in the next 50 years we can transform our ability to treat these diseases."

scientific thinking that it inspired. Virginia Tech's regenerative medicine research sectors, which include stem cell biology and biomolecular engineering, often rely on the logic of the paradigm shift which stemmed from Sir Wilmut's experiment. In the interests of curing diseases and remedying genetic informalities, the genetic code itself can be focused on, with the understanding that all changes made will be mechanically expressed in the organism.

Sir Wilmut spent some time addressing the "focus of interest

Below: The Lyric Theatre's marquee advertises for the Dolly Experiment lecture. The convenient downtown location brought in a full crowd for the lecture.

Below: Sir Wilmut moves from behind the podium to call himself a "specimen." His lecture was very engaging and kept the audience intrigued.

and anxiety" associated with cloning. He described how overwhelming it was to receive such mixed and unsure reactions from both the public and the scientific community after his team successfully cloned a sheep. Even though they had 150 days, Dolly's approximate gestation time, to consider their response ("a long eureka", Wilmut teased), they could not anticipate the intensity of the reaction they received. Professor Wilmut emphasized that the work of Virginia Tech and so many other institutions should be something that "we [are] excited about and not afraid of," and he reiterated his optimism about the future of cloning: "We can revolutionize regenerative medicine."

Sophomore Pamplin College of Business major Hope Hodges was among those in attendance. After hearing about the event through the flyers posted on campus, Hodges was inspired by the topic of genetic engineering, calling it "the future of medicine," and hoping it "will save countless in the next century." Hodges was also encouraged by the clear, easy-to-understand format of Sir Wilmut's lecture, a comfort that contributed to convincing her that genetic research is on its way to eradicating the taboos which have characterized its early stages. As a business student, Hodges is one example of how interdisciplinary interests and pursuits can merge to accomplish the common goal of biologically-focused engineering, whether it be through hands-on involvement or general understanding and support.

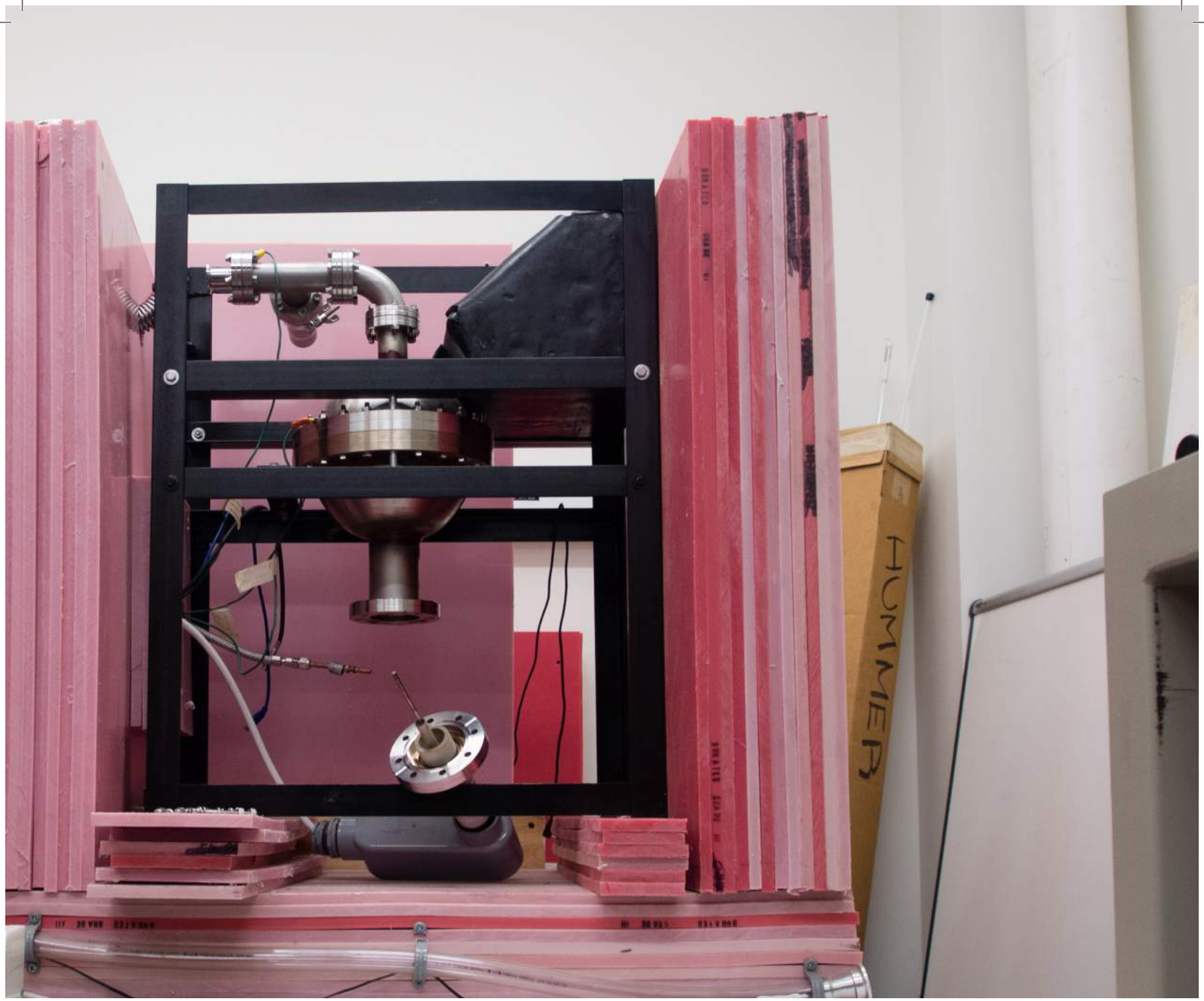
Sir Wilmut's presentation spoke well to the research pursuits of the many arms of the College of Engineering as it expands its reach into the medical sector. As Wilmut put it, "it is only by studying the disease that you can understand it…in the next 50 years… [we can] transform our ability to treat these diseases."

Right: A specialized reaction chamber under maintenance. The Radiation Measurements Lab is fully equipped with fusion demonstration reactors, fusion chambers, and a composite flat panel for simulation and visualization.

VIRGINIA TECH'S NEWEST MINOR: NUCLEAR ENGINEERING

Written by Alex John
Freshman General Engineering

Photos by Jun Yu



X-ray technology, power plants, and modern weapon design are all tied to one fundament – nuclear engineering.

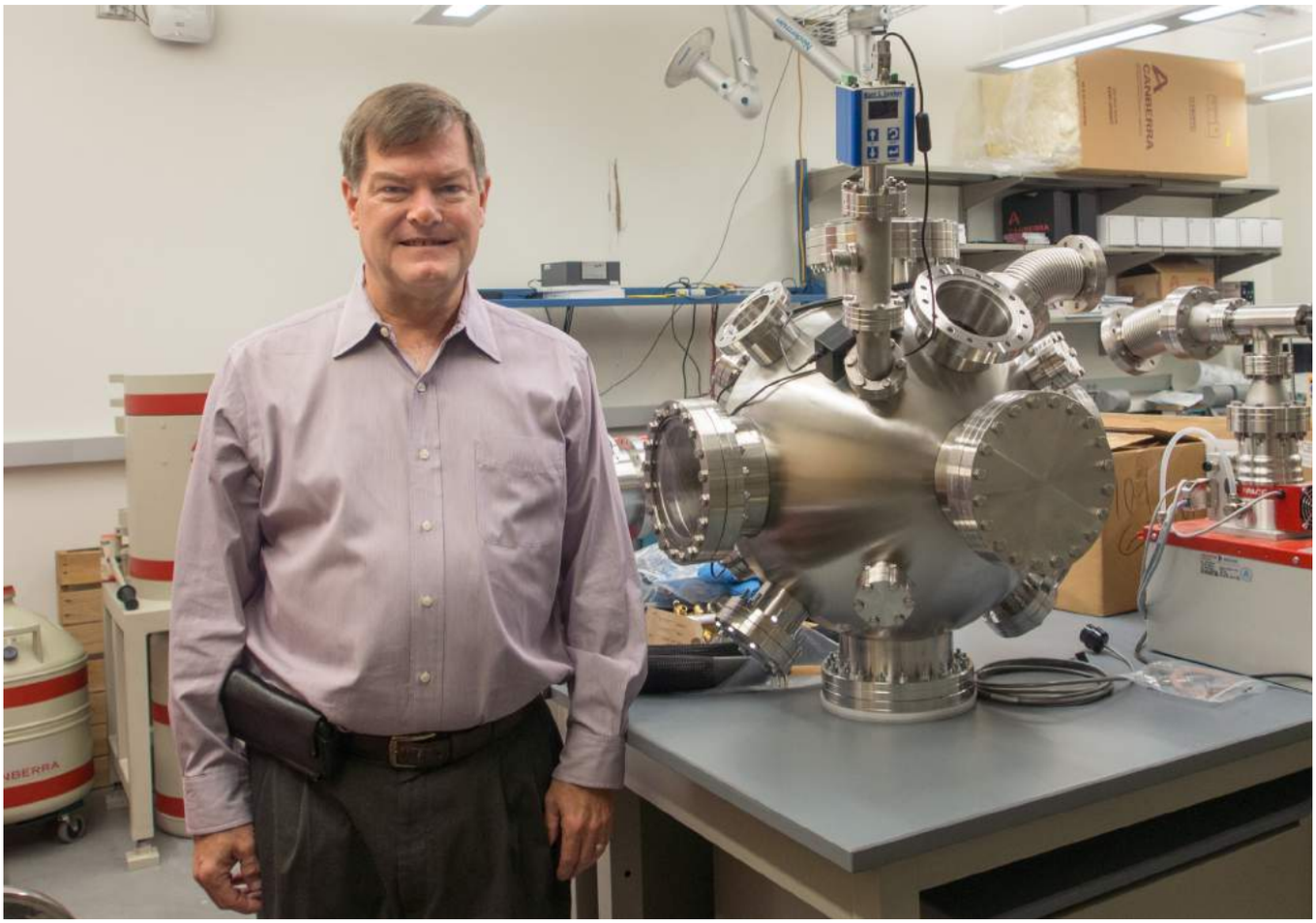
Nuclear engineers focus the development and use of machinery that uses nuclear energy. Some of their work involves designing and maintaining power plants, developing nuclear powered medical devices, and researching new applications of nuclear power. Nuclear engineers are a growing part of the workforce, and opportunities continue to rise as we implement more nuclear technology.

One of the most relevant nuclear engineering fields, power generation, is consistently increasing in demand. According to the U.S. Energy Information Administration, electricity production worldwide will increase by 69% by 2040. There is a constant need globally for nuclear engineers who can find and employ viable uses of nuclear energy to produce electricity for future generations.

Currently, Virginia Tech offers nuclear engineering degrees at the masters and doctorate level – the degrees are granted by the Department of Mechanical Engineering. Under this umbrella, students have the option to conduct research within one or more fields: nuclear theory and computation, nuclear materials research, nuclear power operations, emerging nuclear technology, and nuclear safety.

At the undergraduate level, Virginia Tech currently allows students to take six courses related to nuclear engineering – these courses include Fundamentals of Nuclear Engineering, Radiation Detection, Protection and Shielding, and various research and independent study credits. However, students presently cannot undertake a degree-granting nuclear engineering program. Fortunately, Virginia Tech may start offering a Nuclear Engineering minor to undergraduate students as early as fall, 2017.

Below: Dr. Pierson shows off one of the lab's fusion chambers. This remarkable piece is fully operational for demonstration and is one of a few operational fusion chambers in the lab.



The idea of implementing the minor received a lot of interest by students who took the Fundamentals of Nuclear Engineering course. If the minor is put into effect, it could serve as a feeder program for the graduate program. In addition, students could combine the minor with an electrical or mechanical engineering degree to broaden their employability in these industries.

According to Dr. Mark Pierson, one of the leaders the nuclear engineering program, the goal is to implement the minor before the course offering is increased – ideally, the minor would be approved by the university this May and then implemented in the fall semester. Once the minor has been enacted, the priority will be on faculty growth to accommodate new classes. Currently, the program has only five faculty members available to teach courses.

Students who are interested in pursuing the minor would have to take one math course and five nuclear engineering courses. All the nuclear engineering courses could be fulfilled by technical electives for mechanical engineering students, but other majors would have to complete the courses independently from their required classes.

In addition to potential courses being added, students can support their minor by participating in several labs. One of the labs, which is managed by Dr. Pierson, is the Radiation Measurements Lab. The lab supplements coursework and research in radiation detection and measurements, nuclear safeguards, and particle transport with most of its focus being on radiation detection. One of the most interesting components of the lab is the fusion demonstration reactor. The reactor takes deuterium gas and fuses it to helium gas while giving off neutrons. To remove the electrons off the deuterium gas and allow the deuterium neutrons to fuse together, a high voltage must be achieved within the reactor.

Nuclear engineers are becoming essential in many aspects of our day-to-day lives – ranging from power generation to medicine. As nuclear engineering continues to achieve new heights of relevancy, we hope to see Virginia Tech usher in this exciting new wave of scientific advancement into our community.

Below: Virginia Tech Students Vy Nguyen, Scott Hand, and Barrett Cosgrove pose with students from the Hope Integrated Secondary School System. VT students enjoyed many interactions with these young children.

VIRGINIA TECH ENGINEERS SHED LIGHT ON UGANDA

Below: Virginia Tech graduate student Vy Nguyen puts the final touches on a solar panel at Hope Integrated Secondary School System. Vy was a crucial member of the support team for Engineers without Borders.

Written by Abby Slater
Sophomore Creative Writing

Photos Provided by VT EWB
Edited by James Shackleford

The Virginia Tech Chapter of Engineers Without Borders (EWB-VT) is lighting up Uganda one solar panel at a time. The project began in 2007 and now provides solar-powered energy to two schools, a lab, and a children's home. A key component of the project is the tireless effort of project leader Vy Nguyen, a graduate student in Mechanical Engineering, supported by her team of students and mentors.

We take for granted the low cost of electricity in America, which averages 12 cents per kilowatt-hour. Ugandans pay a much higher rate of 22 cents per kilowatt-hour, and this is for unreliable electricity. In addition, the rural communities EWB-VT serves rake in an average monthly income of under $100. "When you look at an average household where they spend maybe $3 per meal per day, paying that much for electricity is a lot of money," says Nguyen, who has traveled to Uganda repeatedly with the team since 2014. The high cost of power and the frequent unscheduled blackouts—lasting anywhere from an hour to longer than a day—make electricity a luxury in these communities.

But why use solar panels in such a poor community? Uganda's location on the equator makes it a prime candidate for solar energy, which gives EWB-VT the perfect opportunity to step in and help. "We provide clean, low cost energy to developing school systems, impoverished communities, and orphans," says Barrett Cosgrove, a senior Environmental Policy and Planning major here at Virginia Tech.

Below: VT Engineers Without Borders (EWB) professional mentor Phil Powell installs a solar panel on a roof at Hope Integrated Secondary School System. Mr. Powell is a long-term member of EWB and has been a part of the Uganda project since 2008.

By installing solar photovoltaic panels, EWB-VT has helped provide electricity for Hope Integrated Secondary School System in Kyetume, as well as Nazareth Children's Home and St. Joseph's School System.

These 5x3.5' solar panels capture the powerful Ugandan sunlight, which the panels then convert into electrical energy via a phenomenon called the pholtoelectric effect. This energy is then stored in large battery banks and converted from DC power to easily accessible AC power. These batteries offer various levels of energy supply that can be adjusted depending on the availability of government-supplied power. Overnight, during blackouts, or over the course of the rainy season—which accounts for half of the year—the electricity provided by EWB-VT is invaluable to these communities. Students and mentors install the wires and panels themselves with the help of mentor Phil Powell (Director of Grid Innovations, Dominion Power), a member of the professional chapter of EWB who has been apart of the Uganda Project since 2008.

A large focus of EWB-VT's work is preventing certain problems common to other volunteer projects. There is always a danger that foreign volunteer groups will visit once and not return, leaving the community with little to no knowledge of how to maintain the system. To avoid this issue, the EWB-VT team signs a contract ranging from five to seven years. During their contracted time EWB-VT can develop a lasting relationship

"Energy offers a higher level of independence, education, and economic advancement in the developing world. With renewable and affordable energy these communities are able to progress towards a brighter future."

–Barrett Cosgrove

with the community, and with proper installation maintenance the panels are expected to last up to fifteen years. The team also teaches members of the community to manage and maintain the systems.

The first week of the recent trip in August was devoted to implementing an electrical system in a welding lab. The EWB-VT team documented the process and wrote a manual for community members to use once they left. The team spent the next two days training local Ugandans to maintain the system. Once the community feels comfortable using the system, EWB-VT will officially transfer ownership, creating energy independence for the village.

Nguyen emphasizes that they are there only to help and don't want to impede jobs or any other lucrative opportunities for the Ugandans. "We're not trying to take away from or shut down the main electricity companies in Uganda, they still are using Ugandan power; we're just presenting them with an alternative, almost like a backup" Nguyen says. The team even purchases the solar panels and batteries in Uganda to further support the local economy.

The support EWB-VT provides doesn't just keep the lights on at night. Projects such as the installation of panels at the welding lab prepare the communities and the children within them for the future. "We were able to provide students with skills that they can take into the workforce," says Nguyen. EWB-VT thus helps ensure a future for Ugandan children and provides crucial energy to improve the present.

Vy and her team plan to return to Kyetume in 2017 to implement a sixth solar photovoltaic system, monitor previously installed sites, and start new communication in hopes of expanding the project to new schools and communities. Virginia Tech's helping hand isn't just limited to the continent of Africa, EWB-VT has ongoing water and sanitation projects in Guatemala and the Dominican Republic as well. No matter the project, the Virginia Tech Chapter of Engineers Without Borders continues to do good, whether they're educating students within the community or across the Atlantic. We can't wait to see what great heights they reach in 2017.

WANT TO WRITE ABOUT ENGINEERING AND GET PAID FOR IT?

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